

Terrence Gosliner first noticed the aggressive individuals of *P. ianthina* and attracted my attention to watch them (he subsequently observed another similar encounter). I wish to thank him, Mr. David Brunckhorst, Mr. McGill, and an anonymous referee for comments on an earlier version of this manuscript.

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The Occurrence of Living Mollusks on *Diopatra* Tube-Caps

by

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Introduction

Tube-caps of the onuphid polychaete *Diopatra* were shown by BELL & COEN (1982) to serve as a substrate for a variety of meiofauna, and other researchers have discussed larger organisms found in association with tube-caps (e.g., MANGUM *et al.*, 1968; WOODIN, 1978; GALLAGHER *et al.*, 1983; BAN & NELSON, 1987; LUCKENBACH, 1987). In the present note we report specifically on the ubiquitous presence of epibiont mollusks on tube-caps at three widely separated collecting sites.

Materials and Methods

Thirty-six tube-caps (12 from each site) were collected by hand at low tide from three moderately protected sand flats: *Diopatra ornata* (Moore, 1911) from Venado Beach, Pacific coast of Panama (February 1986); and *Diopatra cuprea* (Bosc, 1802) from Tom's Cove, Assateague National Seashore, Virginia, U.S.A. (June 1987) and from Wheeler's Beach, Woods Hole, Massachusetts, U.S.A. (July 1987). The Panama and Assateague specimens were

Table 1

Molluscan species found on 12 *Diopatra* tube-caps at each of three sites (numbers of individuals in parentheses).

Panama

Anachis sp. (4)
Crepidula sp. cf. *excavata* (Broderip, 1834) (23)
Crucibulum sp. (2)
Nassarius (*Arcularia*) *complanatus* (Powys, 1835) (1)
Notoacmaea sp. cf. *subrotundata* (Carpenter, 1865) (1)
Terebra sp. (2)
Theodoxus (*Vittoclinon*) *luteofasciatus* Miller, 1879 (7)
Chione sp. (3)
Modiolus sp. (1)
Nuculana sp. (1)
Sphenia fragilis (H. & A. Adams, 1854) (3)
Unidentified chiton species (3)

Assateague

Crepidula convexa Say, 1822 (1)
Crepidula fornicata L., 1758 (1)
Mercenaria mercenaria (L., 1758) (11)
Unidentified bivalve species (1)

Woods Hole

Crepidula convexa (2)
Crepidula fornicata (2)
Littorina littorea (L., 1758) (3)
Nassarius trivittatus (Say, 1822) (3)
Seila adamsi (Lea, 1845) (1)
Anadara transversa (Say, 1822) (2)
Mya arenaria L., 1758 (2)

air-dried and individually packaged until examined; the Woods Hole specimens were examined within a day of collection. Each tube-cap was examined under a dissecting microscope for epibiont mollusks. Shells of dead mollusks that had been attached by the worm to its tube-cap were identified but were not included in the data. Mollusks that had been alive at the time of collection were recognized in the following ways: gastropods were relatively unworn and had shining apertures and undamaged margins, or (as in the case of *Crepidula* species) were still attached to shell fragments or to the tube itself; bivalves had both valves still connected and closed; and the chitons were still attached to fragments embedded in the tube. Once the epibiont mollusks had been isolated they were identified to the lowest possible taxon. (Panamanian mollusks were identified by the senior author, using KEEN, 1971; the Assateague and Woods Hole species were familiar to all the authors.)

Results and Discussion

Twenty-one species and 80 individuals, none greater than 10 mm in length, were found on the examined *Diopatra* tube-caps (Table 1). The Panamanian tube-caps each had two or more epibiont mollusks (up to nine on one individual), whereas those from Assateague and Woods Hole often had none or only one (Table 2). Gastropods, bivalves,

Table 2

Distribution of mollusks on 12 *Diopatra* tube-caps from each site.

Site	Number of individual mollusks per tube-cap									
	0	1	2	3	4	5	6	7	8	9
Panama			3	3	2		2	1		1
Assateague	6	2	3				1			
Woods Hole	3	6	1	1	1					

and chitons were present, with gastropods being the most abundant, comprising 57% of the species and 66% of the individuals.

These results show that the crevices formed by the shells, shell fragments, and other debris incorporated into *Diopatra* tube-caps by their builders offer a previously unrecognized substrate for mollusks. It is particularly interesting that almost half of the species represented—all the *Crepidula* spp., *Theodoxus luteofasciatus*, *Anachis* sp., *Sphenia fragilis*, the chiton, *Crucibulum* sp., *Notoacmaea cf. subrotundata*, and *Seila adamsi*—are hard-bottom organisms. In the broad expanse of sand flats, *Diopatra* tube-caps may therefore represent a valuable resource, especially for those smaller species that could attain sexual maturity while living on this space-limited substrate. How effective tube-caps are as possible refuges from predation (small mollusks on sand flats can be subject to heavy predation pressure, *e.g.*, DUDLEY, 1980) or as long-term settlement sites for young individuals of species such as *Mercenaria mercenaria* that can attain large adult sizes, are questions to be resolved by an experimental approach. In view of the apparently widespread use of tube-caps by mollusks that this study documents such questions are worthy of investigation.

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Dietary-Induced Hyperlipidemia in *Biomphalaria glabrata* (Gastropoda)

by

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Introduction

The planorbid snail *Biomphalaria glabrata* (Say, 1818) is an intermediate host of the medically important trematode *Schistosoma mansoni*, and has been used for numerous physiological and biochemical studies. Relatively little information is available on lipids in this snail, although a recent study examined lipids in fed and starved *B. glabrata* (DUNCAN *et al.*, 1987).

Information on dietary-induced hyperlipidemia in this snail is not available. Unpublished studies in our laboratory show that *Biomphalaria glabrata* fed a high lipid diet, *i.e.*, hen's egg yolk, ingest and utilize the material, grow, and lay eggs. The purpose of this study is to determine if snails fed hen's egg yolk elevate their lipids compared to snails fed leaf lettuce. *Biomphalaria glabrata* may serve as a useful invertebrate model to study dietary-induced hyperlipidemia in humans.

Materials and Methods

Snails, 10 ± 2 mm in shell diameter, were removed from stock cultures, placed in artificial spring water (DUNCAN *et al.*, 1987) and fed boiled hen's egg yolk (experimental) or leaf lettuce (controls) *ad libitum*. Food and water were changed every other day, and some snails on experimental and control diets were removed for examination 1 and 2 weeks after the cultures were initiated.

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